

Chest Contour

A Comparison of American and Russian Track Stars

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■ *Measurement of the chests and other physical features of United States and Soviet Russian track and field stars showed the Americans broader chested, taller, lighter in weight and about two and a half years younger.*

Comparison of the measurements of the American group with those made on the 1940 and 1949 N.C.A.A. track and field stars in a previous study indicated that the Americans are developing relatively broader, flatter chests and are growing taller.

BECAUSE OF REFERENCES made some years ago to certain great track stars being barrel-chested, I measured the chests of 98 track stars who participated in the 1940 National Collegiate Athletic Association track and field meet held in Minneapolis. The results indicated that the chests of these athletes were relatively broad and flat.³ Again in 1949 I made a similar study on 120 participants who competed in the N.C.A.A. track and field meet in Los Angeles. My findings⁴ were like those of the earlier study. And for the third time I was prompted to carry out such a study when the finest track and field stars of Russia and the United States met in a dual track and field meet, July 12-13, 1964, in Los Angeles. The purposes were:

1. To determine whether there was any appreciable difference between these two groups in chest development, height and weight, and
2. To compare the measurements of the 1964 American team with those made on the 1940 and 1949 track and field stars.

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Submitted January 19, 1965.

Material and Method of Study

Chest measurements were made on 40 of each group. The transverse and anteroposterior diameters of the chest were measured at the nipple level at the end of quiet expiration. A pelvimeter calibrated in centimeters was used for measurements. Age, height, and weight were obtained from the recorded figures in the official bulletin. The thoracic index (TI) which is the ratio of the depth of the chest to the width is determined by dividing the anteroposterior diameter by the transverse diameter. This gives a number less than one, which then is multiplied by 100 to give whole numbers. The TI is recorded to the third digit.

Results

Thoracic Index.—Chart 1 depicts the thoracic index range and the mean average for both the Americans and the Russians. The TI range of the American group was from 589 to 742 and the mean value was 647; for the Russian group the range was 624 to 785 and the mean value 709.

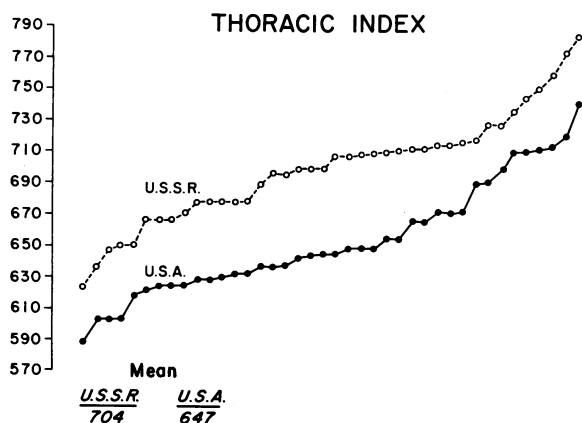


Chart 1.—Thoracic Index Range (column at left) of 40 Russian and 40 American track and field stars. (Each dot and circle represents one athlete.)

Height

The range in height of the Americans was from 66 inches to 79.5 inches and the mean average 73 inches; of the Russians, 64 to 75.5 inches with a mean of 71.4 inches.

Weight

The weight range of the Americans was from 120 to 260 pounds with a mean average of 166. For the Russians the range was from 136 to 243 pounds and the mean 171 pounds.

Age

The Americans ranged in age from 18 to 32 years with a mean average of 24 years. The age range of the Russians was from 20 to 34 years and the mean 26.5 years.

Comparison of the measurements of the 1964 American team compared with those of the 1940 and 1949 N.C.A.A. stars indicates that American track and field stars are developing broader, flatter chests

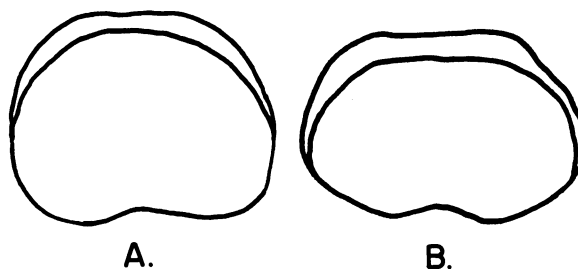


Figure 1.—Pantographic tracings showing manner of chest excursion from end of quiet expiration to full inspiration (Malone¹) in A deep chest, and B broad chest.

and are growing taller. The mean TI dropped from 677 in the 1940 group to 647 in the 1964 team, and the mean average height was almost an inch greater. There apparently was no appreciable change in weight (Table 2).

The foregoing data (summarized in Table 1) indicates that the Russians were deeper chested, about one and a half inches shorter, slightly heavier and about two and a half years older than the Americans.

Discussion

In earlier studies^{2,5,6} it was observed that the chest of the newborn is almost round. At the end of the first inspiration the depth is even greater than the width. The TI is about 1.060. The chest flattens rapidly in infancy. At the end of the first year the TI is about .780, and by age five the depth of the chest is about 72 per cent of the width (TI .720). Maturity of the chest is reached at about the age of puberty, when the TI is about .670⁷ (in the present study even lower). This is normal chest development. The deep chest, one with a high TI, probably can be considered one of retarded development. This type was found more often in the children of the poorer socioeconomic groups.⁸

TABLE 1.—Mean Averages, Physical Data, U.S.A. and U.S.S.R. Groups of Athletes

	Thoracic Index*	Age	Height (inches)	Weight (pounds)	Number Measured
Americans	647	24 yrs.	73	166	40
Russians	704	26.5 yrs.	71.4	171	40†

*Ratio of depth of chest to width.

†Only 35 cases for height and weight.

TABLE 2.—Comparative Mean Measurements of the 1940 and 1949 N.C.A.A. Stars with the 1964 Group

	Thoracic Index	Height (inches)	Weight (pounds)	Numbers Measured
N.C.A.A. 1940	677	98
N.C.A.A. 1949	667	72	166	120
American team 1964.....	647	73	166	40

The deeper the chest (higher T₁), the more nearly perpendicular are the ribs to the spine. The broader the chest (lower T₁), the more diagonally the ribs. On inspiration the greater expansion is anterior and upward in the deep chest; in the broad chest, expansion is mostly lateral, upward, and forward. Malone¹ demonstrated this many years ago by pantographic tracings of the chest, showing that the chest expansion and vital capacity are greater in the broad chest (Figure 1).

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ACKNOWLEDGMENT

I am indebted to Glenn Davis of the *Los Angeles Times*, director of the U.S.A. vs. U.S.S.R. Dual Track Meet, July 25-26, 1964, Los Angeles, for his support in carrying on this study.

REFERENCES

1. Malone, F. R.: The relation of chest contour to lung capacity, *J.A.M.A.*, 43:783, 1904.
2. Scammon, R. E.: Studies on the growth and structure of the infant thorax, *Radiology*, 9:89, 1927.
3. Weisman, S. A.: Are track stars barrel chested? *J. Lancet*, 60:539, 1940.
4. Weisman, S. A.: Track stars are not barrel chested, *J. Lancet*, 73:280, 1953.
5. Weisman, S. A.: Development of the human chest, *Minn. Med.*, 17:244, May, 1934.
6. Weisman, S. A.: Contour of the chest in children, I, According to age, *Am. J. Dis. Child.*, 49:47, 1935.
7. Weisman, S. A.: Your Chest Should Be Flat, J. B. Lippincott, Philadelphia, 1938.
8. Weisman, S. A.: Contour of the chest in children, III, Environment, *Am. J. Dis. Child.*, 49:52, 1935.

